

CLAIM(S)

1. A heat recovery ventilator for use in ventilating a room, or the like, comprising means for venting a stale airstream of an indoor climate to the outside air, means for supplying a fresh airstream from the outside air of an outside climate, at least two stationary regenerative heat exchangers and a rotating air switch for transferring the stale airstream to the regenerative heat exchangers from the means for venting the stale airstream of the indoor climate and for transferring the fresh airstream from the regenerative heat exchangers to the means for supplying the fresh airstream from the outside air of the outside climate, said rotating air switch being rotatably mounted and including:

- (a) a first circular side plate having an air flow opening therein,
- (b) a second circular side plate having a pair of air flow openings, said second plate spaced apart and disposed opposed and parallel to said first plate, and
- (c) a single manifold extending from said air flow opening in said first side plate to one of said pair of said air flow openings in said second side plate, said manifold enclosing said air flow opening in said first side plate and said one of said air flow openings in said second side plate and forming a fresh air passage way for transferring the fresh airstream from the regenerative heat exchangers to the means for supplying the fresh airstream from the outside air of the outside climate, said other opening in said second side plate forming a stale air passageway for transferring the stale airstream from the means for venting the stale airstream of the indoor climate to the regenerative heat exchangers; and wherein air flows in opposite directions through the same regenerative heat exchanger.

2. The heat recovery ventilator of claim 1, wherein said air switch is isolated from the outside climate by said regenerative heat exchangers.

3. The heat recovery ventilator of claim 1, further comprising a plurality of noncontacting clearance seals, one said noncontacting clearance seal disposed between said first circular plate of said rotating air switch and both the means for venting the stale airstream of the indoor climate and the means for transferring the fresh airstream from the outside air of the outside climate, and said remaining noncontacting clearance seals disposed between said second circular plate and said stationary regenerative heat exchangers.

4. The heat recovery ventilator of claim 1, further comprising four regenerative heat exchangers.

5. The heat recovery ventilator of claim 1, further comprising a filter, wherein said filter is disposed so that the fresh airstream flows through said filter before entering the room.

6. The heat recovery ventilator of claim 5, wherein said filter captures at least 99.97% of particles in the fresh airstream having a diameter greater than 0.3 microns.

7. The heat recovery ventilator of claim 1, wherein said regenerative heat exchangers are elastomer beds.

8. A heat recovery ventilator for use in a room or the like, comprising a housing, two blowers, at least two stationary regenerative heat exchangers, a shaft, a single rotating air switch mounted on said shaft, a motor for driving said blowers and said shaft, one of said blowers for forcing a stale airstream out of the room; the other of said blowers for

forcing a fresh airstream into the room, said air switch, in use, alternately imparting the stale airstream from one said blower to a regenerative heat exchanger, then imparting the fresh airstream to that same heat exchanger and through said other blower, when said air switch rotates in a 180° turn.

5           9.     The heat recovery ventilator of claim 8, wherein said rotating air switch has:

- (a)     a first side plate having an opening and having a center shaft aperture,
- (b)     a second side plate having two openings spaced from each other, and a center shaft aperture,
- (c)     a single manifold extending from said first side plate to said second side plate, wherein said manifold connects said opening of said first side plate with one of said openings in said second side plate forming a fresh air passageway, and
- 15       (d)     a shaft receiving portion extending from said first side plate to said second side plate;

wherein said rotating switch is disposed upon said shaft, said shaft disposed in said shaft receiving portion, and wherein, in use, the fresh airstream flows from said regenerative heat exchangers through said fresh air passageway and is forced out by said other blower, and wherein said other opening of said second side plate along with a portion of the manifold and a portion of the shaft receiving portion form a stale air passageway from said one blower to said regenerative heat exchangers, for transferring the stale airstream to said regenerative heat exchangers.

25           10.    The heat recovery ventilator of claim 8, wherein said housing has:

- (a)     first compartment containing said one blower, said first compartment having a plurality of openings therein for forcing

the stale airstream to flow into said housing and through said one blower,

- (b) a second compartment containing said other blower and said motor, said second compartment having a plurality of openings therein for permitting the fresh airstream to exit the housing and to enter the room,
- (c) a third compartment containing said rotating air switch, and
- (d) a fourth compartment containing said regenerative heat exchangers, said fourth compartment having a plurality of openings therein for forcing the stale airstream out of said fourth compartment and for allowing the fresh airstream to be drawn into said fourth compartment.

11. The heat recovery ventilator of claim 10, wherein

- (a) said first compartment is next to said second compartment and shares a common blower bulkhead,
- (b) said third compartment is adjacent to both said first compartment and said second compartment and shares a common motor bulkhead with said first compartment and said second compartment, said motor bulkhead having a first opening into said first compartment and a second opening into said second compartment, and
- (c) said fourth compartment is spaced from said first and second compartments and is adjacent to said third compartment, said fourth compartment sharing a common regenerator bulkhead with said third compartment, said regenerator bulkhead having an opening therein, said rotating air switch disposed in said third compartment with one end of said rotating air switch adjacent the opening in the regenerator bulkhead and the other end of said rotating air switch adjacent to the opening in the motor bulkhead between the second and third compartments.

12. A rotating air switch for use in a heat recovery ventilator used in a room or the like, the heat recovery ventilator of the type having a housing, a first blower, a second blower, at least two stationary regenerative heat exchangers, a shaft for mounting the air switch upon, a motor for driving the blowers and said shaft, the first blower for forcing a stale airstream out of the housing; the second blower for forcing a fresh airstream into the housing,

the rotating air switch comprising:

- (a) a first side plate having an opening and having a center shaft aperture,
- (b) a second side plate having two openings spaced from each other, and a center shaft aperture,
- (c) a shaft receiving portion extending from said first side plate to said second side plate and connecting said center shaft apertures,
- (d) a single manifold extending from said first side plate to said second side plate, said manifold connecting said opening on said first side plate with one of said openings in said second side plate and forming a fresh air passageway there between, said other of said openings of said second side plate along with a portion of said manifold and a portion of said shaft receiving portion forming a stale air passageway from said first blower to said regenerative heat exchanger,

the rotating air switch, in use, alternately imparting the stale airstream from the first blower to a regenerative heat exchanger, then imparting the fresh airstream to that same regenerative heat exchanger.

13. The rotating air switch of claim 12, wherein said opening on said first side plate and said two openings of said second side plate are each pie shaped.

14. The rotating air switch of claim 13, wherein said opening on said first side plate and said two openings of said second side plate each subtend an angle of about 90°.

5 15. The rotating air switch of claim 12, wherein said manifold is pie shaped.

16. The rotating air switch of claim 12, wherein said opening on said first side plate, said two openings of said second side plate and said manifold are each pie shaped.

10 17. The rotating air switch of claim 12, wherein said opening on said first side plate and each said two openings of said second side plate subtend an angle of about 90° and said two openings of said second side plate are spaced about 90° apart.

15 18. The rotating air switch of claim 12, wherein when said rotating switch is disposed upon the shaft and travels through a 180° rotation, the fresh airstream flows from the regenerative heat exchangers through the fresh air passageway and is forced out of the housing by the second blower, and the first blower forces the stale airstream through the stale air passageway and into said same regenerative heat exchangers.

20 19. A housing for a heat recovery ventilator having a single rotating air switch having a pair of opposing side plates, a plurality of regenerative heat exchangers, a fresh air blower, a stale air blower, a motor for driving the blowers and the air switch, said housing comprising:

25 (a) a first compartment containing a stale air blower, said first compartment having a plurality of openings therein for providing for a stale airstream from an indoor climate to flow into said first compartment,

- (b) a second compartment containing the fresh air blower and the motor, said second compartment adjacent said first compartment, said second compartment having a plurality of an openings therein for providing for a fresh airstream to flow out of said second compartment and into the indoor climate,
- (c) a third compartment generally parallel to and adjacent to both said first and second compartments, said third compartment containing said rotating air switch, said first and third compartments having a common opening there between for the stale airstream to flow from said first compartment into said third compartment, and into a stale air passageway in the rotating air switch, said third compartment having a common opening to said second compartment disposed in communication with an opening in one of said opposing side plates of the rotating air switch, and
- (d) a fourth compartment generally parallel to and adjacent to said third compartment, said fourth compartment generally parallel to and spaced from both said first and second compartments by said third compartment, said fourth compartment containing the regenerative heat exchangers, said fourth compartment having a common opening to said third compartment through which the other opposing side plate of the rotating air switch is in communication, said fourth compartment having a plurality of openings permitting the air fresh airstream to flow into the regenerative heat exchangers from an outdoor climate and the stale airstream to flow out of the regenerative heat exchangers into the outdoor climate.

20. The housing of claim 19, further comprising a fifth compartment, generally parallel to and adjacent to said first and second compartments, said fifth compartment having a plurality of openings

therein, and bearing a particulate filter therein, wherein the fresh airstream exits said second compartment and enters said fifth compartment traveling through the filter and exiting through said openings in said fifth compartment.

5           21. A method of providing indoor ventilation using a heat recovery ventilator having stationary rectangular regenerative heat exchangers, two blowers, one rotating air switch, a motor for driving the blower and air switch, all disposed in a housing, the housing having stale air openings for allowing a stale airstream to enter the housing and fresh air openings for  
10 allowing fresh air to exit from said housing; the method comprising the steps of:

- (a) forcing a stale airstream from an indoor climate into the housing,
- (b) blowing the stale airstream into the rotating air switch,
- 15 (c) transporting the stale airstream from the rotating air switch into the stationary rectangular regenerative heat exchangers,
- (d) simultaneously exchanging heat and moisture from the stale airstream onto the regenerative heat exchangers and forcing the stale airstream to flow out of the housing,
- 20 (e) forcing fresh air into the housing and through the same regenerative heat exchangers,
- (f) exchanging heat and moisture on the regenerative heat exchangers into the fresh airstream,
- (g) forcing the fresh airstream, which is heated and moisturized,  
25 into the rotating air switch and through the fresh air blower, and
- (h) forcing the fresh airstream, which is heated and moisturized, out of the housing and into the indoor climate.



22. The method of claim 21, wherein the rotating air switch includes

(a) a first side plate having an opening and having a center shaft aperture,

5 (b) a second side plate having two openings spaced from each other, and a center shaft aperture,

(c) a shaft receiving portion extending from said first side plate to said second side plate and connecting said center shaft apertures,

10 (d) a single manifold extending from said first side plate to said second side plate, said manifold connecting said opening of said first side plate with one of said openings in said second side plate and forming a fresh air passageway there between, said other of said openings of said second side plate along  
15 with a portion of said manifold and a portion of said shaft receiving portion forming a stale air passageway from said first blower to said regenerative heat exchanger,

and wherein the method further comprises in step (b) blowing the stale airstream into the stale air passageway, in step (c) transporting the stale  
20 airstream from the stale air passageway in the rotating air switch into the stationary regenerative heat exchangers, and in step (g) forcing the fresh airstream into the fresh air passageway in the rotating air switch and through the fresh air blower.

23. The method of claim 22, further comprising the step of  
25 providing a particulate filter to the housing and filtering the fresh airstream prior to step (h).